Pulmonary Function Testing

Pulmonary function tests are a group of tests that measure how well the lungs take in and release air and how well they move gases such as oxygen from the atmosphere into the body's circulation.

Your cooperation while performing the test is crucial in order to get accurate results. A poor seal around the mouthpiece of the spirometer can give poor results that can't be interpreted. Do not smoke before the test.

Spirometry measures airflow. By measuring how much air you exhale, and how quickly, spirometry can evaluate a broad range of lung diseases. In a spirometry test, while you are sitting, you breathe into a mouthpiece that is connected to an instrument called a spirometer. The spirometer records the amount and the rate of air that you breathe in and out over a period of time.

For some of the test measurements, you can breathe normally and quietly. Other tests require forced inhalation or exhalation after a deep breath. Sometimes you will be asked to inhale the substance or a medicine to see how it changes your test results.

Lung volume measurement can be done in two ways:

- The most accurate way is to sit in a sealed, clear box that looks like a telephone booth (body plethysmograph) while breathing in and out into a mouthpiece. Changes in pressure inside the box help determine the lung volume.
- Lung volume can also be measured when you breathe nitrogen or helium gas through a tube for a certain period of time. The concentration of the gas in a chamber attached to the tube is measured to estimate the lung volume.

To measure diffusion capacity, you breathe a harmless gas, called a tracer gas, for a very short time, often for only one breath. The concentration of the gas in the air you breathe out is measured. The difference in the amount of gas inhaled and exhaled measures how effectively gas travels from the lungs into the blood. This test allows the doctor to estimate how well the lungs move oxygen from the air into the bloodstream.

Do not eat a heavy meal before the test. Do not smoke for 4 - 6 hours before the test. You'll get specific instructions if you need to stop using bronchodilators or inhaler medications. You may have to breathe in medication before or during the test.

Since the test involves some forced breathing and rapid breathing, you may have some temporary shortness of breath or lightheadedness. You breathe through a tight-fitting mouthpiece, and you'll have nose clips.

Pulmonary function tests are done to:

- Diagnose certain types of lung disease (such as asthma, bronchitis, and emphysema)
- Find the cause of shortness of breath
- Measure whether exposure to chemicals at work affects lung function
- Check lung function before someone has surgery

It also can be done to:

- Assess the effect of medication
- Measure progress in disease treatment

Normal values are based upon your age, height, ethnicity, and sex. Normal results are expressed as a percentage. A value is usually considered abnormal if it is less than 80% of your predicted value.

Normal value ranges may vary slightly among different laboratories. Talk to your doctor about the meaning of your

specific test results.

Different measurements that may be found on your report after spirometry include:

- Expiratory reserve volume (ERV)
- Forced vital capacity (FVC)
- Forced expiratory volume (FEV)
- Forced expiratory flow 25% to 75%
- Functional residual capacity (FRC)
- Maximum voluntary ventilation (MVV)
- Residual volume (RV)
- Peak expiratory flow (PEF).
- Slow vital capacity (SVC)
- Total lung capacity (TLC)

Abnormal results usually mean that you may have some chest or lung disease.

Some lung diseases (such as emphysema, asthma, chronic bronchitis, and infections) can make the lungs contain too much air and take longer to empty. These lung diseases are called obstructive lung disorders.

Other lung diseases make the lungs scarred and smaller so that they contain too little air and are poor at transferring oxygen into the blood. Examples of these types of illnesses include:

- Extreme overweight
- Fibrosis of the lungs
- Lung cancer
- Sarcoidosis and scleroderma